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(71) Applicant(s)
Sobering Thoughts Limited

(Incorporated in the United Kingdom)

Eden Valley Cottage, Unthank, FREUCHIE, Fife, KY7 7HT, United Kingdom

(72) Inventor(s)
Stewart Rankin

(74) Agent and/or Address for Service
Cruikshank & Fairweather
19 Royal Exchange Square, GLASGOW, G1 3AE, United Kingdom

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(54) Composition for combatting dehydration

(57) An analgesic free composition soluble in water to form a product for rehydrating or preventing dehydration of an individual, wherein the composition comprises, (percentage/dry weight):

Glucose	10 - 70%
Sucrose	1 - 50%
Fructose	1 - 60%
Sodium Chloride	0.5 - 5%
Potassium Chloride	0.1 - 2%
Potassium Sorbate	0.1 - 2%
Citric Acid (anhydrous)	0.5 - 10%
Ascorbic Acid	0.05 - 2%

The composition can be used to prevent hangovers or used to treat dehydration arising from physical exertion or diarrhoea.

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Product for Combatting Dehydration

The present invention relates to a product for combatting dehydration, in particular for rehydrating or preventing dehydration of individuals.

Individuals can become dehydrated for a number of reasons; for instance as a result of alcohol consumption, physical exertion, or disease. Typically this results in an imbalance of water and electrolytes.

Consumption of alcohol can result in individuals becoming dehydrated and suffering from associated headaches and/or nausea. This is typically termed a hangover. A number of products are known in the art which can be taken to relieve the symptoms of a hangover. Generally such products are in powder or tablet form and are added to water to provide a rehydration product for an individual to drink. These products invariably contain an analgesic, such as paracetamol or aspirin, to provide relief from pain. In this manner these products are only to provide rehydration once an individual is dehydrated, they are not designed to prevent dehydration. Moreover, it may be undesirable to use analgesics in this manner. For instance aspirin can exacerbate some of the problems associated with alcohol consumption, such as gastrointestinal bleeding.

It is an object of the present invention to obviate and/or mitigate the above disadvantages by providing a product suitable for rehydrating or preventing dehydration of an individual and which is analgesic free.

The present invention provides an analgesic free composition soluble in water to form a product for rehydrating or preventing dehydration of an individual, wherein the composition comprises, (percentage/dry wt):

Glucose	10 - 70%
Sucrose	1 - 50%
Fructose	1 - 60%
Sodium Chloride	0.5 - 5%
Potassium Chloride	0.5 - 5%
Potassium Sorbate	0.1 - 2%
Citric Acid (anhydrous)	0.5 - 10%
Ascorbic Acid	0.05 - 2%

The invention also relates to an aqueous product which comprises the dry composition dissolved in water.

It has surprisingly been found that the method of formulating the composition in order to produce an aqueous product is important to its function of combatting dehydration.

The present invention further provides a method of producing an aqueous product from the composition of the present invention comprising:

(i) forming a first mixture of the glucose, the sucrose, the fructose and the anhydrous citric acid, in the percentages disclosed, wherein the anhydrous citric acid is added as the last ingredient;

(ii) forming a second mixture of the sodium chloride, the potassium chloride, the potassium sorbate and the ascorbic acid, in the percentages disclosed, wherein the ascorbic acid is added as the last ingredient; characterised in that water is added to the first mixture to dissolution of the said first mixture prior to addition of the second mixture to the solution so-produced.

Preferably the first and second mixtures are in dry powder form such as may be formed into sachets, granules, tablets and the like.

Without wishing to be bound by any theory it is thought that separating the two acid components and adding these last to each mixture, prevents undesirable reaction of the acids with the other ingredients.

Any additional ingredients such as flavourings and/or colourings can be subsequently included in the product.

Typically when a person becomes dehydrated, there is an increased osmotic pressure of extracellular fluid, which results in a movement of fluid out of the cells; the osmolality of which is increased. It is thought that the sensation of thirst and the need to replace fluid is produced by the increased osmotic pressure of the fluid within cells. However, thirst is not present when the blood alcohol is high; it appears only when the alcohol has been metabolised. It has been suggested that the hypothalamic thirst centres are put out of action by alcohol, just at the time when it is important to replace fluid and prevent dehydration ("The Textbook on Physiology & Biochemistry"

(7th Edition) by George Bell et al).

The present invention finds application, for example, in preventing the onset of symptoms associated with a hangover in an individual. The product may also be taken to prevent dehydration rather than to provide rehydration. In the case of preventing the onset of symptoms associated with hangover the product can be taken immediately after alcohol consumption and before any dehydration occurs.

The present invention therefore provides a product suitable for use in preventing the onset of symptoms associated with a hangover. The present invention further provides a product suitable for use in preventing dehydration particularly after alcohol consumption. The present invention still further provides a product suitable for use in rehydrating.

The product of the present invention may also be taken to provide rehydration to an individual after physical exertion or to an individual who is dehydrated due to an illness resulting in diarrhoea, such as from cholera, gastrointestinal infections and food poisoning. Individuals travelling for long periods of time, such as on long haul aircraft flights can also become dehydrated, particularly due to alcohol consumption and may therefore also benefit from taking the product. Furthermore while the application is directed to individuals, more particularly human individuals, the product may be used in veterinary applications in order to rehydrate animals in need of such rehydration.

The product may also contain a number of additional ingredients such as additional sugars, flavourings, colourings,

vitamins, stabilisers, whole fruit powder and the like. Preferably the product is effervescent typically by carbonation using carbon dioxide.

Without wishing to be bound by the following theory, it is believed that the sugars provide energy and aid with the efficient uptake of electrolytes in the small intestine of an individual. The sodium chloride and potassium chloride are electrolyte replenishers. Potassium sorbate is a preservative. Citric acid is a pH acid control agent and provides some flavouring. Ascorbic acid (vitamin C) in addition to providing an individual with this important vitamin, also provides an antimicrobial and antioxidant function.

The amount of each component in the composition is independently selected, depending on the particular application the composition is to be used for. The amount of glucose in the composition is between 10 - 70%, preferably 15 - 60% and more preferably 20 - 40%. The amount of sucrose in the composition is between 1 - 50%, preferably 5 - 40% and more preferably 10 - 35%. The amount of fructose in the composition is between 1 - 60%, preferably 10 - 55% and more preferably 20 - 50%. the amount of sodium chloride in the composition is between 0.5 - 5%, preferably 0.75% - 3% and more preferably 1 - 2%. The amount of potassium chloride in the composition is between 0.5% - 5%, preferably 0.75% - 3% and more preferably 1 - 2%. The amount of potassium sorbate in the composition is between 0.1 - 2%, preferably 0.15 - 1% and more preferably 0.2 - 0.75%. The amount of citric acid (anhydrous) in the composition is between 0.5 - 10%, preferably 1 - 7.5% and more preferably 1.5% - 5%. The

amount of ascorbic acid in the composition is preferably 0.25 - 2%, preferably 0.075 - 1% and more preferably 0.1 - 0.5%. The above percentages are all percentage/dry weight of the composition.

The composition is dissolved in water to provide the aqueous product. Preferably the composition is dissolved in the ratio of 1 part composition to 10 parts water, more preferably 1 part composition to 5 parts water.

Typically an individual is to take between 200 - 500 ml of the aqueous product, for instance 300 - 400 ml.

The pH of the aqueous product is generally below pH 8. Preferably the pH of the aqueous product is between 3 - 7.5, more preferably 3 - 5.5.

A particularly preferred formulation of an analgesic free composition embodying the present invention comprises, (percent/dry weight);

Glucose	25 - 35%
Sucrose	20 - 30%
Fructose	35 - 45%
Sodium Chloride	1 - 2%
Potassium Chloride	1 - 2%
Potassium Sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 4.5%
Ascorbic Acid	0.1 - 0.4%

The above formulation is diluted 1 part composition to 5 parts water by weight to provide an aqueous product suitable for

rehydrating or preventing dehydration of an individual following alcohol consumption.

A further preferred formulation of an analgesic free composition embodying the present invention comprises, (percentage/dry weight);

Glucose	55 - 60%
Sucrose	2 - 30%
Fructose	1.5 - 30%
Sodium Chloride	1.5 - 2.5%
Potassium Chloride	1.5 - 2.5%
Potassium Sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 2.8%
Ascorbic Acid	0.1 - 0.5%

The above formulation is diluted 1 part composition to 5 parts water (by weight) to provide an aqueous product suitable for rehydrating or preventing dehydration of an individual following physical exertion.

A further preferred formulation of an analgesic free composition embodying the present invention comprises, (percentage/dry weight);

Glucose	55 - 60%
Sucrose	20 - 30%
Fructose	1.5 - 2.5%
Sodium Chloride	1.5 - 2.5%
Potassium Chloride	1.5 - 2.5%

Potassium Sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 2.8%
Ascorbic Acid	0.1 - 0.5%

The above formulation is diluted 1 part composition to 5 parts water (by weight) to provide an aqueous product suitable for rehydrating or preventing dehydration of an individual following long periods of travel.

An example of an orange flavoured rehydration product embodied by the present invention is described below.

Example

132g glucose, 180g fructose and 96g sucrose are mixed together as a dry powder. To this mixture is added and mixed in 12g anhydrous citric acid. This mixture is then added to 800 - 900ml of water and the solution stirred until the mixture dissolves to form a sugar/citric acid solution.

Separately, 6g sodium chloride, 6g potassium chloride and 1.5g potassium sorbate are mixed together, before addition and mixing in of 1.08g ascorbic acid (vitamin C). This dry mixture is then added to the sugar/citric acid solution and stirred until all the mixture dissolves.

5.72g of Natural Orange Flavouring No 1. NA and 3.10g of Carotene emulsion 12405 is then added to the solution and the solution made to 1 litre by the addition of water. This provides a concentrate which is diluted with water and carbonated to provide the final product. The concentrate is diluted in a ratio of 1 part concentrate to 5 parts water and carbonated by the

addition of CO_2. The resulting rehydration product has a pH of 3.

The above product has been found to be particularly efficacious in preventing the symptoms associated with a hangover, when taken immediately after alcohol consumption.

The above example can easily be modified to include, antimicrobials, vitamins, colouring agents and the like. The product could also be formulated using naturally effervescent spring water, thus removing the requirement to carbonate the product.

The above product provides an orange flavoured and appropriately coloured rehydrating drink. Alternative formulations for a citrus rehydrating drink and lemon and lime rehydrating drink contain the same principal components in like amounts, but comprise different flavourings/colourings. For example, the citrus rehydrating drink comprises 2.87g of natural lemon and lime flavouring D1415, 2.87g of natural orange flavouring No 1. NA and 0.0012g of blue H7250 colouring. The lemon and lime rehydrating drink comprises 5.72g lemon and lime flavouring D1415, 0.0075g quinolene yellow H8573 and 0.0015g blue H7250 colouring.

While the invention has been described in connection with specific embodiments thereof, it will become apparent to those skilled in the art that various modifications to the product and/or further applications can be envisaged.

Claims

1. An analgesic free composition soluble in water to form a product for rehydrating or preventing dehydration of an individual, wherein the composition comprises, (percentage/dry weight):

Glucose	10 - 70%
Sucrose	1 - 50%
Fructose	1 - 60%
Sodium Chloride	0.5 - 5%
Potassium Chloride	0.1 - 2%
Potassium Sorbate	0.1 - 2%
Citric Acid (anhydrous)	0.5 - 10%
Ascorbic Acid	0.05 - 2%

2. An analgesic free composition according to claim 1 wherein the amount of glucose in the composition is between 15 - 60%.

3. An analgesic free composition according to claim 1 wherein either of claims 1 or 2 wherein the amount of sucrose in the composition is between 5-40%.

4. An analgesic free composition according to any preceding claim wherein the amount of fructose in the composition is between 10-55%.

5. An analgesic free composition according to any preceding claim wherein the amount of sodium chloride in the composition is between 0.75-3%.

6. An analgesic free composition according to any preceding claim wherein the amount of potassium chloride in the composition is between 0.75-3%.

7. An analgesic free composition according to any preceding claim wherein the amount of potassium sorbate in the composition is between 0.15-1%.

8. An analgesic free composition according to any preceding claim wherein the amount of citric acid (anhydrous) in the composition is between 1-7.5%.

9. An analgesic free composition according to any preceding claim wherein the amount of ascorbic acid in the composition is between 0.075-1%.

10. An analgesic free product comprising a composition according to any preceding claim dissolved in the ratio of 1 part composition to 10 parts water.

11. An analgesic free product comprising a composition according to any one of claims 1 to 9 dissolved in the ratio of 1 part composition to 5 parts water.

12. An analgesic free product according to either of claims 10 or 11 wherein the pH of the aqueous product is between pH3-7.5.

13. An analgesic free product according to any one of claims 10 to 12 further comprising flavourings and/or colourings in an amount of, (percentage/dry weight):

flavourings	0.3 - 3%
colourings	0.001% - 2%

14. An analgesic free product comprising a composition dissolved in the ratio of 1 part composition to 5 parts water by weight to provide an aqueous product suitable for rehydrating or preventing dehydration of an individual following alcohol consumption, wherein the composition comprises, (percentage/dry weight):

Glucose	25 - 35%
Sucrose	20 - 30%
Fructose	35 - 45%
Sodium Chloride	1 - 2%
Potassium Chloride	1 - 2%
Potassium sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 0.5%
Ascorbic acid	0.1 - 0.4%

15. An analgesic free product comprising a composition dissolved in the ration of 1 part composition to 5 parts

water by weight to provide an aqueous product suitable for rehydrating or preventing rehydration of an individual following physical excertion, wherein the composition comprises, (percentage/dry weight):

Glucose	55 - 60%
Sucrose	20 - 30%
Fructose	1.5 - 30%
Sodium chloride	1.5 - 2.5%
Potassium Chloride	1.5 - 2.5%
Potassium sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 2.8%
Ascorbic acid	0.1 - 0.5%

16. An analgesic free product comprising a composition dissolved in the ratio of 1 part composition to 5 parts water by weight to provide an aqueous product suitable for rehydrating or preventing dehydration of an individual following long periods of travel, wherein the composition comprises, (percentage/dry weight) following long periods of travel:

Glucose	55 - 60%
Sucrose	20 - 30%
Fructose	1.5 - 2.5%
Sodium chloride	1.5 - 2.5%
Potassium Chloride	1.5 - 2.5%
Potassium sorbate	0.25 - 0.5%
Citric Acid (anhydrous)	1.5 - 2.8%
Ascorbic acid	0.1 - 0.5%

17. An analgesic product according to any one of claims 10 to 16 wherein the product is made effervescent by carbonation.

18. A method of producing an aqueous product according to any of claims 10 to 17 comprising

(i) forming a first mixture of the glucose, the sucrose, the fructose and the anhydrous citric acid, in the percentages disclosed, wherein the anhydrous citric acid is added as the last ingredient;

(ii) forming a second mixture of the sodium chloride, the potassium chloride, the potassium sorbate and the ascorbic acid, in the percentages disclosed, wherein the ascorbic acid is added as the last ingredient; characterised in that water is added to the first mixture to dissolution of the said first mixture prior to addition of the second mixture to the solution so-produced.

19. A method according to claim 18 wherein the first and second mixture are in dry powder form.

20. Use of a composition according to any one of claims 1 to 9 in the manufacture of an aqueous product for preventing dehydration in an individual.

21. Use of a composition according to any one of claims 1 to 9 in the manufacture of an aqueous product for providing rehydration in an individual.

22. Use of a composition according to either of claims 20 or 21 in the manufacture of an aqueous product for preventing the onset of symptoms associated with a hangover.

The Patent Office

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Claims searched: 1 to 22

Examiner: Mr S J Pilling
Date of search: 23 April 1997

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Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

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Int Cl (Ed.6): A61K 31/375, 31/70, 33/14, A23L 2/38, 2/385, 2/39

Other: ONLINE: DIALOG/MEDICINE, WPI, CLAIMS, JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 1262235 A (BALAKIAN) see the examples.	-
A	WO 91/12734 A1 (UNIVERSITY OF TEXAS) see Examples I and III.	-

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.